Supplementary Table 1. List of inherited metabolic diseases with neoplastic phenotypes, laboratory investigation, treatment options (if applicable), OMIM references and IEMbase ID.

Disorder (n=64)	Gene	Connective tissue, muscle and blood vessels tumors	Leukemias and lymphomas and blood neoplasias	Neuroendocrine and gland tumors	Brain tumors	Liver and biliary duct tumors	Genitourinary neoplasms	Melanoma and mucosal neoplasms	Laboratory investigations	Specific treatment	OMIM	IEMbase ID (hyperlinked)	References (PMID)
DISORDERS OF NITROGEN-CONTAINING COMPOUNDS (n=9)													
Disorders of glutathione metabolism													
Methylthioadenosine phosphorylase deficiency	*MTAP*	Osteosarcoma, fibrosarcoma, malignant fibrous histiocytoma							DNA		156540	IEM1245	
Organic aciduria													
Methylmalonic aciduria due to methylmalonyl-CoA mutase deficiency (Organic aciduria)	*MMUT*					Hepatocellular carcinoma, hepatoblastoma			Amino acids (P); Organic acids (U); Acylcarnitines (U, P, DBS); Anion gap	Low protein diet, carnitine, hydroxycobalamin, ammonia scavengers, orthotopic liver transplant	609058	IEM0127	31260114
Disorders of ammonia detoxification													
Ornithine transcarbamylase deficiency	*OTC*					Hepatocellular carcinoma, hepatocellular adenoma			Ammonia (P); Amino acids (P); Purines and pyrimidines (U)	Low protein diet, ammonia scavengers, citrulline, liver transplant	311250	IEM0058	22129577, 31662921
Citrin deficiency	*SLC25A13*	Hemangioendothelioma				Hepatocellular carcinoma			Ammonia (P); Amino acids (P)	Low carbohydrate diet, MCT oil, ammonia scavengers, liver transplant	605814;603471	IEM0063	30181955, 30591617, 19413723, 17000460
Argininosuccinate lyase deficiency	*ASL*					Hepatocellular carcinoma			Ammonia (P); Amino acids (P, U); Purines and pyrimidines (U)	Low protein diet, ammonia scavengers, citrulline, liver transplant	207900	IEM0060	28251416
Arginase deficiency	*ARG1*					Hepatocellular carcinoma			Ammonia (P); Amino acids (P); Purines and pyrimidines (U)	Low protein diet, ammonia scavengers	207800	IEM0061	29187023, 26123990
Disorders of tyrosine metabolism													
Fumarylacetoacetase deficiency Tyrosinemia type 1	*FAH*					Hepatocellular carcinoma, hepatoblastoma			Amino acids (P); Organic acids (U); Succinylacetone (DBS)	Nitisinone, tyrosine and phenylalanine restricted diet	276700	IEM0096	7927251, 20547648
Disorders of sulfur amino acid and sulfide metabolism													
S-adenosylhomocysteine hydrolase deficiency	*AHCY*					Hepatocellular carcinoma			Amino acids (P); Homocysteine (P); S-Adenosylcysteine (P)	Methionine or protein restricted diet, phosphatidylcholine and creatine supplements, liver transplant	613752	IEM0100	26527160
Disorders of lysine metabolism													
Glutaryl-CoA dehydrogenase deficiency Glutaric aciduria type 1	*GCDH*				Medulloblastoma, glioblastoma				AST/ALT (P); Organic acids (U); Acylcarnitines (U, P, DBS)	Low lysine and tryptophan restricted diet, carnitine, riboflavin	231670	IEM0134	30217722
DISORDERS OF VITAMINS, COFACTORS, METALS AND MINERALS (n=4)													
Disorders of niacin and NAD metabolism													
Nicotinamide nucleotide transhydrogenase deficiency	*NNT*			Testicular adrenal rest tumors					Steroids (P); Glucose (P)	Fludrocortisone	614736	IEM0245	25879317
Disorders of iron metabolism													
Hereditary hemochromatosis	*HFE*					Hepatocellular carcinoma			Iron (S); Ferritin (S); Transferin saturation (S)	Phlebotomy, iron chelation therapy	235200	IEM0284	15508107
Disorders of cobalamin metabolism													
Methylmalonic aciduria, cblB type	*MMAB*					Hepatocellular carcinoma			Amino acids (P); Organic acids (U); Acylcarnitines (U, P, DBS); Anion gap	Low protein diet, carnitine, hydroxycobalamin, ammonia scavengers	251110	IEM0219	31260114
Disorders of copper metabolism													
Copper-transporting ATPase subunit beta deficiency Wilson disease	*ATP7B*					Hepatocellular carcinoma, cholangiocarcinoma			AST/ALT (P); Copper (S, U); Ceruloplasmin (S)	Copper chelators, zinc, liver transplant	277900	IEM0279	25369181
DISORDERS OF CARBOHYDRATES (n=11)													
Disorders of carbohydrate transport													
Glucose transporter 2 deficiency Fanconi-Bickel syndrome	*SLC2A2*					Hepatocellular carcinoma			AST/ALT (P), Glucose (S), Amino acids (U), Urinalysis, Lipid panel (S), Oligosaccharide (U), Galactose (RBC)	Frequent meals, corn starch, electrolyte replacement	227810	IEM0316	28382841
Disorders of galactose metabolism													
Galactose-1-phosphate uridyltransferase deficiency Classic galactosemia	*GALT*					Hepatocellular adenoma			Galactose (P, U), AST/ALT (P), Galactose-1-P (RBC), GALT enzyme activity (RBC); PT/PTT (B)	Lactose-free, galactose restricted diet	230400	IEM0322	12983108
Glycogen storage diseases													
Glucose-6-phosphate transporter deficiency Glycogen storage disease type 1b	*SLC37A4*					Hepatocellular adenoma			AST/ALT (P), CK (P), Lactate (P), Glucose (P), Biotinidase (P)	Frequent meals, uncooked cornstarch, filgrastim	232220	IEM0355	9138172
Hepatic phosphorylase kinase α2 subunit deficiency Glycogen storage disease type 9a	*PHKA2*					Hepatocellular adenoma			Fatty acids and ketones (P, U); Glucose (P)	Uncooked cornstarch	306000	IEM0361	25266922
Phosphorylase kinase β subunit deficiency Glycogen storage disease type 9b	*PHKB*					Hepatocellular adenoma			Fatty acids and ketones (P, U); Glucose (P)	Uncooked cornstarch	261750	IEM0362	25266922
Hepatic phosphorylase kinase γ2 subunit deficiency Glycogen storage disease type 9c	*PHKG2*					Hepatocellular carcinoma, hepatocellular adenoma			Fatty acids and ketones (P, U); Glucose (P)	Uncooked cornstarch	613027	IEM0363	34876562, 24389071, 32244026
Amylo-1,6-glucosidase (debrancher) deficiency Glycogen storage disease type 3	*AGL*					Hepatocellular carcinoma, hepatocellular adenoma			AST/ALT (P), CK (P), Lactate (P), Glucose (S), Glycogen (L), Biotinidase (P)	Ketogenic and high-protein diet	232400	IEM0357	9138172, 17196294
Glycogen branching enzyme deficiency Glycogen storage disease type 4	*GBE1*					Hepatocellular adenoma			AST/ALT (P); Bilirubin (P); PT/PTT (B)	Liver transplant	232500	IEM0358	8285839
Liver glycogen phosphorylase deficiency Glycogen storage disease type 6	*PYGL*					Hepatocellular carcinoma			Fatty acids and ketones (P, U); Glucose (P); Biotinidase (P)	Uncooked cornstarch	232700	IEM0360	21620082
Disorders of gluconeogenesis													
Glucose-6-phosphatase deficiency Glycogen storage disease type 1a	*G6PC*					Hepatocellular carcinoma, hepatocellular adenoma			ASAT/ALAT (P), Lactate (P), Glucose (S), Glycogen (L), Biotinidase (P)	Frequent meals, uncooked cornstarch	232200	IEM0370	9138172, 31898434
Disorders of pentose metabolism													
Transaldolase deficiency	*TALDO1*	Hemangioma				Hepatocellular carcinoma			ASAT/ALAT (P); Polyols (U); Hemoglobin (B)	Liver transplant	606003	IEM0329	34677006, 25388407
MITOCHONDRIAL DISORDERS OF ENERGY METABOLISM (n=15)													
Disorders of the Krebs cycle													
Fumarate hydratase deficiency, tumoral phenotype Hereditary leiomyomatosis and renal cell cancer	*FH*	Cutaneous leiomyoma, uterine leiomyoma		Pheochromocytoma, paraganglioma			Renal carcinoma		Lactate (P), Organic acids (U), Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	150800	IEM0402	15937070, 24334767
Mitochondrial malate dehydrogenase deficiency, tumoral phenotype	*MDH2*			Pheochromocytoma, paraganglioma					Lactate (P), Organic acids (U), Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	154100	IEM0403	30008476
Cytosolic NADP+-dependent isocitrate dehydrogenase 1 superactivity	*IDH1*	Chondrosarcoma, chondroma	Acute myeloid leukemia		Glioma				Organic acids (U)		147700	IEM1090	21598255, 20692206
Mitochondrial NADP+-dependent isocitrate dehydrogenase 2 superactivity	*IDH2*	Chondrosarcoma, chondroma	Acute myeloid leukemia		Glioma				Organic acids (U), 2-hydroxyglutaric acid chiral analysis (U)		613657	IEM0397	21598255, 20692206
Dihydrolipoamide succinyltransferase deficiency	*DLST*			Pheochromocytoma, paraganglioma					Organic acids (U), Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	126063	IEM1086	30929736
GTP-specific succinyl-CoA synthetase subunit beta deficiency	*SUCLG2*			Pheochromocytoma, paraganglioma					Organic acids (U), Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	x	x	34415331
Disorders of mitochondrial carriers													
Mitochondrial oxoglutarate/malate carrier deficiency Hereditary paraganglioma syndrome type 6	*SLC25A11*			Paraganglioma					DNA		604165	IEM1091	29431636
Disorders of complex II subunits													
Succinate dehydrogenase subunit A deficiency, tumoral phenotype Hereditary paraganglioma syndrome type 5	*SDHA*			Pheochromocytoma, paraganglioma, gastrointestinal stromal tumor, pituitary adenoma			Renal carcinoma		Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	614165	IEM0448	29239034
Succinate dehydrogenase subunit B deficiency, tumoral phenotype Paragangliomas 4	*SDHB*			Pheochromocytoma, paraganglioma, gastrointestinal stromal tumor, pituitary adenoma			Renal carcinoma		Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	185470	IEM0449	29239034
Succinate dehydrogenase subunit C deficiency, tumoral phenotype Hereditary paraganglioma syndrome type 3	*SDHC*			Pheochromocytoma, paraganglioma, gastrointestinal stromal tumor, pituitary adenoma			Renal carcinoma		Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	605373	IEM0451	29239034

Succinate dehydrogenase subunit D deficiency, tumoral phenotype Hereditary paraganglioma syndrome type 1	*SDHD*			Pheochromocytoma, paraganglioma, gastrointestinal stromal tumor, pituitary adenoma					Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	168000;171300	IEM0453	29239034
Disorders of complex II assembly													
Succinate dehydrogenase complex assembly factor 2 deficiency, tumoral phenotype Hereditary paraganglioma syndrome type 2	*SDHAF2*	Pulmonary chondroma		Pheochromocytoma, paraganglioma					Catecholamines (P, U)	Alpha-adrenergic receptor blocker as pre-treatment for surgery	601650	IEM0455	29239034
Disorders of mitochondrial metabolite repair													
L-2-hydroxyglutarate dehydrogenase deficiency	*L2HGDH*				Medulloblastoma, glioblastoma, ependymoma, astrocytoma, oligodendroglioma				Organic acids (U, CSF), 2-hydroxyglutaric acid chiral analysis (U)		236792	IEM0405	33061758, 24894778, 15159502
Disorders of mitochondrial nucleotide pool maintenance													
Mitochondrial deoxyguanosine kinase deficiency	*DGUOK*					Hepatocellular carcinoma			Alpha-fetoprotein (S); Glucose (P); Lactate (P); Activity respiratory chain complexes (I, III, IV, and V)		251880	IEM0493	30589726
MPV17 deficiency Navajo neurohepatopathy	*MPV17*					Hepatocellular carcinoma			Glucose (P); GGT (P); Activity respiratory chain complexes (I, III, IV, and V)		256810	IEM0494	32703289, 20074988
DISORDERS OF LIPIDS (n=11)													
Disorders of phosphoinositide metabolism													
Catalytic phosphatidylinositol 3-kinase α subunit superactivity	*PIK3CA*				Retinoblastoma, meningioma, vestibular schwannoma		Wilms tumor		Fatty acids and ketones (P, U); Glucose (P)		171834	IEM0698	27191687, 12072801, 28737257
Phosphatidylinositol 3-kinase regulatory subunit 1 deficiency SHORT syndrome	*PIK3R1*		Hodgkin lymphoma, EBV-positive lymphoproliferative disease		Glioblastoma				IgG; IgA; IgM (S)		269880;616005	IEM0700	34307262, 28785028, 24165795
Phosphatidylinositol 3,4,5-trisphosphate 3-phosphatase deficiency PTEN hamartoma tumor syndrome	*PTEN*	Fibroma		Thyroid cancer, thyroid adenoma			Breast cancer, renal carcinoma, endometrial carcinoma, uterine leiomyoma		DNA		158350	IEM0704	31570378
Disorders of lipoprotein metabolism													
Apolipoprotein B deficiency	*APOB*					Hepatocellular carcinoma			LDL cholesterol (P); Triglyceride (S); Apo B (P); Vitamin A, D, E, K (P); PT/PTT (B)	Low fat diet, vitamin ADEK supplementation	615558	IEM0716	9824140, 23723369
Disorders of steroid metabolism													
21-hydroxylase deficiency Congenital adrenal hyperplasia	*CYP21A2*			Testicular adrenal rest tumors					Steroids (P); ACTH (P), Glucose (P), Sodium (P), Potassium (P), aldosterone (P), renin (P); 17-OH-progesterone (P, U)	Glucocorticoid and mineralocorticoid replacement therapy	201910	IEM0754	31214118
11-beta-hydroxylase type 1 deficiency Congenital adrenal hyperplasia	*CYP11B1*			Testicular adrenal rest tumors					Steroids (P); ACTH (P), Glucose (P), Sodium (P), Potassium (P), aldosterone (P), renin (P); 17-OH-progesterone (P, U)	Glucocorticoid and mineralocorticoid replacement therapy	202010	IEM0755	21686875
Peroxisomal biogenesis disorders													
Peroxin 26 deficiency Peroxisome biogenesis disorder 7 Zellweger	*PEX26*					Hepatocellular carcinoma			VLCFA (P), Pristanic acid (S), Phytanic acid (S), AST/ALT (P), Plasmalogens (RBC), Pipecolic acid (S, U)	Cholic acid	608666	IEM0901	31150129
Disorders of sphingolipid degradation													
Alpha-galactosidase A deficiency Fabry disease	*GLA*				Meningioma		Renal carcinoma	Melanoma	Globotriaosylceramide (P); Globotriaosylsphingosine (P)	Enzyme replacement therapy	301500	IEM0844	28877708
Glucocerebrosidase deficiency Gaucher disease	*GBA*		Multiple myeloma, acute myeloid leukemia, large B cell lymphoma, Hodgkin lymphoma, acute lymphoblastic leukemia, chronic myelogenous leukemia, chronic lymphocytic leukemia			Hepatocellular carcinoma			Glucosylsphingosine (S); Chitotriosidase (B)	Enzyme replacement therapy, substrate reduction, bone marrow transplantation	230800	IEM0832	20425796, 23510066, 29423829
Disorders of lysosomal cholesterol metabolism													
Lysosomal acid lipase deficiency Cholesterol ester storage disease	*LIPA*					Hepatocellular carcinoma, cholangiocarcinoma			Cholesterol (S); Triglyceride (S)	Enzyme replacement therapy	275761	IEM0872	30372535, 10664166, 18339594
Niemann-Pick disease type C1	*NPC1*					Hepatocellular carcinoma			Sterols (P); Filipin test	Miglustat	257220	IEM0870	34138521
DISORDERS OF TETRAPYRROLES (n=7)													
Disorders of heme metabolism													
Porphobilinogen deaminase deficiency Acute intermittent porphyria	*HMBS*					Hepatocellular carcinoma, cholangiocarcinoma			Urobilinogen (U), Porphyrines (U), Delta-ALA (U)	Hemin, dextrose infusion, liver transplantation	176000	IEM0789	8918510, 10898313
Hepatic uroporphyrinogen decarboxylase deficiency Porphyria cutanea tarda	*UROD*					Hepatocellular carcinoma, cholangiocarcinoma			Porphyrines (U), Delta-ALA (U)	Phlebotomy; hydroxychloroquine, iron chelation therapy	176100	IEM0791	30944007
Coproporphyrinogen oxidase deficiency Hereditary coproporphyria	*CPOX*					Hepatocellular carcinoma			Urobilinogen (U), Porphyrines (U), Delta-ALA (U)	Hemin, dextrose infusion, liver transplantation	121300	IEM0793	10898313
Protoporphyrinogen oxidase deficiency Porphyria variegata	*PPOX*					Hepatocellular carcinoma			PBG (U); Porphyrins (U, stools); Fluorescence scanning (P)	Hemin, dextrose infusion, liver transplantation	176200	IEM0794	25301776
Disorders of bilirubin metabolism and biliary transport													
ABCB11 deficiency Progressive familial intrahepatic cholestasis type 2	*ABCB11*					Hepatocellular carcinoma			AST/ALT (P), GGT (S), Bile acids (S), Vitamins A, D, E, K (S)	Ursodeoxycholic acid, vitamin ADEK supplementation, liver transplant	603201	IEM0806	20232290
ABCB4 deficiency Progressive familial intrahepatic cholestasis type 3	*ABCB4*					Cholangiocarcinoma			AST/ALT (P), GGT (S), Bile acids (S), Vitamins A, D, E, K (S)	Ursodeoxycholic acid, vitamin ADEK supplementation, liver transplant	602347	IEM0807	26473142
Canalicular bilirubin glucuronide transporter deficiency Dubin-Johnson syndrome	*ABCC2*					Hepatocellular carcinoma			Bilirubin (S); Pigment granules in liver biopsy		237500	IEM0803	2822978, 26181407
CONGENITAL DISORDERS OF GLYCOSYLATION (n=5)													
Disorders of N-linked glycosylation													
MAGT1-CDG Magnesium transporter 1 deficiency	*MAGT1*		EBV-positive lymphoproliferative disease, Burkitt's lymphoma, Hodgkin lymphoma, Large B cell lymphoma						Sialotransferrins (S)	Magnesium	300853	IEM0925	32451662
Disorders of O-xylosylation and glycosaminoglycan synthesis													
EXT1-CDG Exostosin 1 deficiency	*EXT1*	Chondrosarcoma, osteochondroma, hemangioma							Sialotransferrins (S)		133700	IEM0950	25230886
EXT2-CDG Exostosin 2 deficiency	*EXT2*	Chondrosarcoma, osteochondroma, hemangioma							Sialotransferrins (S)		133701	IEM0951	25230886, 15796962
Disorders of O-GalNAcylation													
C1GALT1C-CDG Core 1 β-1,3-galactosyltransferase chaperone deficiency	*C1GALT1C1*		Myelodysplastic syndrome						Blood count		300622	IEM0964	8219107
Disorders of monosaccharide synthesis and interconversion													
UDP-GlcNAc epimerase/kinase superactivity	*GNE*					Cholangiocarcinoma			Sialotransferrins (S)		269921	IEM1000	27142465
OTHER (n=2)													
Disorders of ribosomal biogenesis													
Autosomal recessive dyskeratosis congenita type 1	*NOLA3*		Acute myeloid leukemia					Squamous cell carcinoma	DNA		224230	IEM1335	28600339
Autosomal recessive dyskeratosis congenita type 2	*NOLA2*		Acute myeloid leukemia					Squamous cell carcinoma	DNA		613987	IEM1336	28600339