### Table S1: List of gene panels used for epilepsy diagnosis in different companies.

| Sl. No. | Company Name (Country of origin) | Phenotype Diagnosed | Gene Panel |
|---------|-----------------------------------|---------------------|------------|
| 1       | Athena Diagnostics Inc (US)       | Epilepsy            | ALDH7A1, CACNA1A, CASR, CHRNA2, CHRNA4, CHRN8B2, CSTB, DEPD5, EFHC1, EPM2A, GABRA1, GABRB3, GABRG2, GRIN2A, KCNM1, KCNQ2, KCNQ3, KNT1, KCTD7, LGI1, MBDS, NLRRC1, PCDH19, PRICKLE1, PRICKLE2, PRRT2, SCARB2, SCN1A, SCN1B, SCN2A, SCN9A, SLC2A1, SLC4A10, TBC1D24, ABAT, ADSL, ALG13, ALG9, AMT, ASA1H, ASPM, ATPIA3, BCKD, BRAT1, CANCA1H, CACNB4, CHD2, CHRNA7, CPA6, CRH, CYP27A1, DYNCH1, FOLR1, GABRB2, GAMT, GATM, GLDC, GOSR2, GRIN2B, HCN1, HCN4, KCN1, KCN2, L2HGDH, LIA5, LMNB2, NDUFA1, PHGDH, PIGO, PNPO, PRIMA1, SCN3A, SCN5A, SLC19A3, SLC25A19, SLC35A2, SLC6A1, SLC6A8, ST3GAL5, STX1B, SUCL2A, SYNJ1, ALPL, ARFGEF2, ARHGEF9, ATP2A2, ATP6A2, ATP6V0A2, ATRX, CASK, CHRNA4, CLN3, CLN5, CLN6, CLN8, CPT2, CTS2, CYD48, DCX, DACNA5, EMX2, FGFD1, FGFR3, FLNA, GPC3, GPR56, GRIA3, LAMA2, LARGE1, LBR, MFSD8, NIPBL, NRXN1, OFD1, OPHN1, PAFAH1B1, PAK3, PANK2, PAX6, PEX7, PHF6, PIGV, PLA2G6, PNKP, PPT1, PQBP1, RAB39B, RAB3GAP1, RAII, RELN, RNASEH2A, RNASEH2B, RNASEH2C, SAMHD1, SCARB2, SCN2A, SCN8A, SERPINH1, SETBP1, SLC25A22, SLC2A6, SMCA1, SMCA3, SMC3, SPTAN1, SPTBP2, STXBP1, SYT, TBX1, TCF4, TPK1, TREC1, TUBA1A, TUBA8, TUBB2B, UBE3A, VPS13A, ZEB2, ARX, ATP1A2, CACNA1A, COL4A1, NOTCH3, CASR, CDKL5, VPS13B, CNTNAP2, CSTB, FKN, FKR, FOXG1, MECP2, MEF2C, PLP1, POLG, POMT1, POMT2, POMGNT1, SYNGAP1, TSC1, TSC2, WDR62, GAF, MCHP1, ADGRV1, ALG13, ANKR1D1, ATP1A2, ATP1A3, CACNA2D1, CACNA2D2, CENP1, CHD2, CHRNA7, CTSF, DAFIF1, DNM1, DOCK7, DPYD, DRYK1A, EEF1A2, GABRB2, GLDC, GNAO1, GOSR2, GRIN1, GRIN2B, GRIN3B, HCN1, HCN4, HNRNPU, HPRT1, IQSEC2, KANS1L1, KCNA2, KCNB1, KCNC1, KCNI, KCSH2, KCNJ11, KIAA2022, L2HGDH, LIA5, LMNB2, MAGI2, NDE1, NDUFA1, NRIII1, PIGA, PIGN, PIGO, PLCB1, PURA, QARS, RBFOX1, ROGD1, SE2D, SHH, SIK1, SIX3, SLC13A5, SNAP25, SPATAT5, ST3GAL3, STIL, SYN1, SIZ1, TBL1XRI, TSEN54, WDR45 |
| 2       | Blueprint Genetics (Finland)      | Childhood absence epilepsy | GABRA1, EFHC1 |
|         |                                   | Juvenile myoclonic epilepsy (JME) | CACNA1H, GABRB3, GABRG2 |
|         |                                   | Familial temporal lobe epilepsy | LGI1, RELN, GAL, CPA6, MICAL1 |
|         |                                   | Genetic generalized epilepsy | SLC2A1, CACNB4 |
| 3       | Emory Genetics Laboratory (US)     | Epilepsy | ABAT, CENP1, DYNJ1, DFNA5, GABRA1, GABRB3, GABRG2, GRIN2A, KCNC1, RELN, |

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**Notes:**
- All gene panels include epilepsy diagnoses.
- The gene panels are specific to each company and include a variety of genes associated with different epilepsy syndromes.
| Sr. No. | Gene  | Phenotype                                      |
|--------|-------|-----------------------------------------------|
| 1      | ALDH7A1 | Pyridoxine-dependent epilepsy                  |
| 2      | BRAT1 | EE                                            |
| 3      | DEPDC5 | Tuberous sclerosis complex, focal epilepsy     |
| 4      | DNM1  | EIEE                                          |
| No. | Gene | Syndrome/Condition |
|-----|------|--------------------|
| 5   | DOLK | Congenital disorder of glycosylation, type Im |
| 6   | FOLR1| Folinic acid-responsive seizures |
| 7   | FOXG1| West syndrome |
| 8   | GABRG2| Childhood absence epilepsy, GEFS+, FS, EIEE |
| 9   | GAMT | Creatine deficiency syndrome 2 |
| 10  | GATM | Creatine deficiency syndrome 3 |
| 11  | GNAO1| EIEE |
| 12  | GRIN2A| Focal epilepsy and speech disorder with/without mental retardation |
| 13  | GRIN2D| EIEE |
| 14  | HCN1 | Paroxysmal non-kinesigenic dyskinesia, with or without generalized epilepsy, idiopathic |
| 15  | KCNMA1| Generalized epilepsy |
| 16  | KCNQ2| EIEE, benign familial neonatal seizures |
| 17  | KCNQ3| EIEE, benign familial neonatal seizures |
| 18  | KCNT1| Autosomal dominant nocturnal frontal lobe epilepsy, epilepsy of infancy with migrating focal seizures |
| 19  | MEF2C| West syndrome |
| 20  | PCDH19| Dravet syndrome-like EIEE/Juberg–Hellman syndrome |
| 21  | PNPO | Pyridoxal 5’-phosphate responsive epilepsy |
| 22  | SCN1A| Dravet syndrome; GEFS+ |
| 23  | SCN2A| EIEE, infantile epilepsy with migrating focal seizures, West syndrome, Ohtahara syndrome, BFINS |
| 24  | SCN8A| EIEE |
| 25  | SLC2A1| Glut-1 deficiency |
| 26  | SLC35A2| Congenital disorder of glycosylation, type IIm |
| 27  | AMACR| Alpha-methylacyl-CoA racemase deficiency, bile acid synthesis defect |
| 28  | CACNB4| Episodic ataxia, epilepsy, idiopathic generalized, susceptibility to, 9 |
| 29  | CASR| Hypocalcemia, neonatal hyperparathyroidism, familial hypocalciuric hypercalcaemia with transient neonatal hyperparathyroidism |
| 30  | CHRNA2| Epilepsy, nocturnal frontal lobe |
| 31  | CHRNA4| Epilepsy, nocturnal frontal lobe |
| 32  | CHRNB2| Epilepsy, nocturnal frontal lobe |
| 33  | CLCN2| Leukoencephalopathy with ataxia, epilepsy |
| 34  | EFHC1| Epilepsy, myoclonic juvenile, epilepsy, severe intractable, epilepsy, juvenile absence |
| 35  | GABRA1| Epileptic encephalopathy, early infantile, epilepsy, childhood absence, epilepsy, juvenile myoclonic |
| 36  | GRIN2A| Epilepsy, focal, with speech disorder |
| 37  | KCNA1| Episodic ataxia/myokymia syndrome |
| 38  | KCNC1| Epilepsy, progressive myoclonic |
| 39  | KCNQ2| Epileptic encephalopathy, early infantile, benign familial neonatal seizures, myokymia |
| 40  | Mtor| Smith–Kingsmore syndrome |
| 41  | NPRL3| Epilepsy, familial focal, with variable foci 3 |
| 42  | POLG| POLG-related ataxia neuropathy spectrum disorders, Sensory ataxia, dysarthria, and ophthalmparesis, Alpers syndrome, progressive external ophthalmpoplegia with mitochondrial DNA deletions, mitochondrial DNA depletion syndrome |
| 43  | PRR72| Episodic kinesigenic dyskinesia, seizures, benign familial infantile, 2, convulsions, familial infantile, with paroxysmal choreoathetosis |
| 44  | RELN| Lissencephaly, epilepsy, familial temporal lobe |
| 45  | SCN1B| Atrial fibrillation, Brugada syndrome, generalized epilepsy with febrile seizures plus, epilepsy, generalized, with febrile seizures plus, type 1, epileptic encephalopathy, early infantile, 52 |
| 46  | SCN9A| Paroxysmal extreme pain disorder, small fiber neuropathy, Erythermalgia, primary, generalized epilepsy with febrile seizures plus, type 7, insensitivity to pain, congenital, autosomal recessive |
| 47  | SLC6A1| Myoclonic-astatic epilepsy |
| Condition                                                                 | Gene   |
|---------------------------------------------------------------------------|--------|
| Deafness, onychodystrophy, osteodystrophy, mental retardation and seizures (DOOR) syndrome, deafness, autosomal dominant | TBC1D24 |
| Myoclonic epilepsy, infantile, familial, epileptic encephalopathy, early infantile |      |
| deafness, autosomal recessive                                              |        |

EE, Epileptic encephalopathy; EIEE, Early infantile epileptic encephalopathy; GEFS+, Generalized epilepsy with febrile seizure plus; FS, Febrile seizures; BFINS, Benign neonatal–infantile seizures; DNA, Deoxyribonucleic acid; DOOR, Deafness, onychodystrophy, osteodystrophy and mental retardation.