**Supplementary Material 1.** Genes and phenotypes associated of the arrhythmia and TruSight™ Cardio sequencing panels**.**

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| **Arrhythmia Sequencing Panel** | | **TruSight™ Cardio Sequencing Panel** | |
| **Associated phenotypes** | **Gene** | | **Associated phenotypes** |
| Atrial fibrillation, Cantu syndrome, Dilated cardiomyopathy (DCM) | ABCC9\* | ABCC9\*, ABCG5, ABCG8, ACTA1, ACTA2, ACTC1, ACTN2, AKAP9, ALMS1, ANK2\*, ANKRD1, APOA4, APOA5, APOB, APOC2, APOE, BAG3\*, BRAF, CACNA1C, CACNA2D1, CACNB2, CALM1\*, CALR3, CASQ2\*, CAV3, CBL, CBS, CETP, COL3A1, COL5A1, COL5A2, COX15, CREB3L3, CRELD1, CRYAB, CSRP3, CTF1, DES\*, DMD, DNAJC19, DOLK, DPP6, DSC2\*, DSG2\*, DSP\*, DTNA, EFEMP2, ELN, EMD, EYA4, FBN1, FBN2, FHL1, FHL2, FKRP, FKTN, FXN, GAA, GATAD1, GCKR, GJA5, GLA, GPD1L, GPIHBP1, HADHA, HCN4, HFE, HRAS, HSPB8, ILK, JAG1, JPH2, JUP\*, KCNA5\*, KCND3, KCNE1, KCNE2\*, KCNE3, KCNH2, KCNJ2\*, KCNJ5, KCNJ8, KCNQ1\*, KLF10, KRAS, LAMA2, LAMA4, LAMP2, LDB3, LDLR, LDLRAP1, LMF1, LMNA, LPL, LTBP2, MAP2K1, MAP2K2, MIB1, MURC, MYBPC3, MYH11, MYH6, MYH7, MYL2, MYL3, MYLK, MYLK2, MYO6, MYOZ2, MYPN, NEXN, NKX2-5\*, NODAL, NOTCH1, NPPA, NRAS, PCSK9, PDLIM3, PKP2\*, PLN, PRDM16, PRKAG2, PRKAR1A, PTPN11, RAF1, RANGRF, RBM20, RYR1, RYR2\*, SALL4, SCN1B, SCN2B, SCN3B\*, SCN4B, SCN5A\*, SCO2, SDHA, SEPN1, SGCB, SGCD, SGCG, SHOC2, SLC25A4, SLC2A10, SMAD3, SMAD4, SNTA1, SOS1, SREBF2, TAZ, TBX20, TBX3, TBX5, TCAP, TGFB2, TGFB3\*, TGFBR1, TGFBR2, TMEM43\*, TMPO, TNNC1, TNNI3, TNNT2, TPM1, TRDN\*, TRIM63, TRPM4\*, TTN\*, TTR, TXNRD2, VCL, ZBTB17, ZHX3, ZIC3. | Aortic Valve Disease, Marfan Syndrome, Loeys-Dietz Syndrome, Short QT Syndrome, Catecholaminergic Polymorphic Ventricular Tachycardia, Familial Hypercholesterolemia, Restrictive Cardiomyopathy, Non-Compaction Cardiomyopathy, Noonan Syndrome, Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC), Brugada Syndrome, Structural Heart Disease, Long QT Syndrome, Familial Aortic Aneurysm, Familial Atrial Fibrillation, Hypertrophic Cardiomyopathy, Dilated Cardiomyopathy |
| Cardiac arrhythmia, Long QT syndrome | ANK2\* |
| Dilated cardiomyopathy (DCM), Myopathy, myofibrillar | BAG3\* |
| Ventricular tachycardia, catecholaminergic polymorphic, Recurrent cardiac arrest, infantile, Long QT syndrome | CALM1\* |
| Catecholaminergic polymorphic ventricular tachycardia | CALM3 |
| Ventricular tachycardia, catecholaminergic, polymorphic | CASQ2\* |
| Arrhythmogenic right ventricular cardiomyopathy (ARVC) | CDH2 |
| Arrhythmogenic right ventricular dysplasia | CTNNA3 |
| Long QT syndrome, Atrial fibrillation, familial | DES\* |
| Dilated cardiomyopathy (DCM), Myopathy, myofibrillar, Scapuloperoneal syndrome, neurogenic, Kaeser type | DSC2\* |
| Arrhythmogenic right ventricular dysplasia with palmoplantar keratoderma and woolly hair, Arrhythmogenic right ventricular dysplasia | DSG2\* |
| Cardiomyopathy, dilated, with wooly hair, keratoderma, and tooth agenesis, Arrhythmogenic right ventricular dysplasia, familial, Cardiomyopathy, dilated, with wooly hair and keratoderma, Keratosis palmoplantaris striata II, Epidermolysis bullosa, lethal acantholytic | DSP\* |
| Arrhythmogenic right ventricular dysplasia, Naxos disease | JUP\* |
| Atrial fibrillation | KCNA5\* |
| Long QT syndrome, Atrial fibrillation, familial | KCNE2\* |
| Short QT syndrome, Andersen syndrome, Long QT syndrome, Atrial fibrillation | KCNJ2\* |
| Short QT syndrome, Long QT syndrome, Atrial fibrillation, Jervell and Lange-Nielsen syndrome | KCNQ1\* |
| Cataract 46, juvenile onset, Arrhythmogenic right ventricular cardiomyopathy (ARVC), Dilated cardiomyopathy (DCM) | LEMD2 |
| Atrial fibrillation, familial, 18 | MYL4 |
| Conotruncal heart malformations, Hypothyroidism, congenital nongoitrous,, Atrial septal defect, Ventricular septal defect 3, Conotruncal heart malformations, variable, Tetralogy of Fallot | NKX2-5\* |
| Atrial fibrillation 15 | NUP155 |
| Arrhythmogenic right ventricular dysplasia | PKP2\* |
| Sudden cardiac failure, infantile | PPA2 |
| Ventricular tachycardia, catecholaminergic polymorphic, Arrhythmogenic right ventricular dysplasia | RYR2\* |
| Atrial fibrillation, familial, Brugada syndrome | SCN3B\* |
| Heart block, nonprogressive, Heart block, progressive, Long QT syndrome, Ventricular fibrillation, Atrial fibrillation, Sick sinus syndrome, Brugada syndrome, Dilated cardiomyopathy (DCM) | SCN5A\* |
| Metabolic encephalomyopathic crises, recurrent, with rhabdomyolysis, cardiac arrhythmias, and neurodegeneration (MECRCN) | TANGO2 |
| Ventricular tachycardia, catecholaminergic polymorphic, 3 | TECRL |
| Loeys-Dietz syndrome (Reinhoff syndrome), Arrhythmogenic right ventricular dysplasia | TGFB3\* |
| Arrhythmogenic right ventricular dysplasia, Emery-Dreifuss muscular dystrophy | TMEM43\* |
| Cardiac conduction disease with or without dilated cardiomyopathy | TNNI3K |
| Ventricular tachycardia, catecholaminergic polymorphic | TRDN\* |
| Progressive familial heart block | TRPM4\* |
| Dilated cardiomyopathy (DCM), Tibial muscular dystrophy, Limb-girdle muscular dystrophy, Hereditary myopathy with early respiratory failure, Myopathy, early-onset, with fatal cardiomyopathy (Salih myopathy), Muscular dystrophy, limb-girdle, type 2J | TTN\* |

\*Genes that are present in both panels.