**Supplementary Appendix**

**Table S1.** Primer pairs utilized for Sanger sequencing verification.

| Primer | Sequence (5'-->3') | Annealing Temperature ($^{O}$C) |
|---|---|---|
| *LMNA4* E290K F | TCCACCCCTCCCAGTCACC | 62 |
| *LMNA4* E290K R | CCCCTTGTCTAACTGAAACCT | |
| *PRDM16* 350fs*48 F | CACCACAGCTGAAAACGCTT | 60 |
| *PRDM16* 350fs*48 R | CGGCAGAGATGTCAGAACCT | |
| *RBM20* R636S F | AGAGTTGGGAGTTAAGAGTGTA | 62 |
| *RBM20* R636S R | GCTGCTGCTTCAGATACTTGT | |
| *TNNT2* R131Q F | GGCACCATTGCTTCAAGACT | 60 |
| *TNNT2* R131Q R | CTCAAGTGATCTACCCGCCTT | |

**Table S2.** Genetic causes of DCM.

| Gene | Inheritance | Allelic Disorders | Partners Healthcare Panel | GeneD$_x$ Panel | Invitae |
|---|---|---|---|---|---|
| ABCC9 | AD | Atrial fibrillation; hypertrichotic osteochondrodysplasia | X | X | X |
| ACTC1 | AD | Atrial septal defect; hypertrophic/restrictive cardiomyopathy; left ventricular noncompaction | X | X | X |
| ACTN2 | AD | Hypertrophic cardiomyopathy; left ventricular noncompaction | X | X | X |
| ALPK3 | AR | Hypertrophic cardiomyopathy | | | |
| ANKRD1 | Unknown | Hypertrophic cardiomyopathy | X | X | X |
| BAG3 | AD | Myofibrillar myopathy | X | X | X |
| CAV3 | AD | Long QT syndrome; distal myopathy; limb-girdle muscular dystrophy; rippling muscle disease | X | X | X |
| CHRM2 | AD | None | X | | X |
| CRYAB | AD/AR | Cataract; myofibrillar myopathy | X | X | X |
| CSRP3 | AD | Hypertrophic cardiomyopathy | X | X | X |
| DES | AD/AR | Limb-girdle muscular dystrophy; myofibrillar myopathy; scapuloperoneal syndrome | X | X | X |
| DMD | XL | Duchenne/Becker muscular dystrophy | X | X | X |
| DOLK | AR | Congenital disorder of glycosylation | X | | X |
| DSC2 | AD | Arrhythmogenic right ventricular dysplasia | X | X | X |
| DSG2 | AD | Arrhythmogenic right ventricular dysplasia | X | X | X |
| DSP | AD/AR | Arrhythmogenic right ventricular dysplasia; Carvajal syndrome; epidermolysis bullosa; keratosis palmoplantaris striata; skin fragility-wooly hair syndrome | X | X | X |
| EMD | XL | Emery-Dreifuss muscular dystrophy | X | X | X |
| EYA4 | AD | Sensorineural hearing loss | | | X |
| FHL2 | Unknown | None | X | | X |
| FKTN | AR | Dystroglycanopathy muscular dystrophy | | | X |
| GATAD1 | AR | None | X | X | X |
| ILK | Unknown | None | X | X | X |
| LAMA4 | Unknown | None | X | X | X |
| LAMP2 | XL | Danon disease | X | X | X |
| LDB3 | AD | Hypertrophic cardiomyopathy; left ventricular noncompaction; myofibrillar myopathy | X | X | X |
| LMNA | AD/AR | Charcot-Marie-Tooth disease; Emery-Dreifuss muscular dystrophy; familial partial lipodystrophy; heart-hand syndrome; Hutchinson-Gilford progeria syndrome, limb-girdle muscular dystrophy; left ventricular noncompaction; Malouf syndrome; Mandibuloacral dysplasia; restrictive cardiomyopathy | X | X | X |
| MURC | AD | None | X | | |
| MYBPC3 | AD | Hypertrophic cardiomyopathy; left ventricular noncompaction | X | X | X |
| MYH6 | AD | Atrial septal defect; hypertrophic cardiomyopathy | X | | X |
| MYH7 | AD | Hypertrophic/restrictive cardiomyopathy; left ventricular noncompaction; myosin storage myopathy; scapuloperoneal syndrome | X | X | X |
| MYPN | AD | Hypertrophic/restrictive cardiomyopathy | X | X | X |
| NEBL | Unknown | Endocardial fibroelastosis | X | X | X |

**Table S2.** Genetic causes of DCM (continued).

| Gene | Inheritance | Allelic Disorders | Partners Healthcare Panel | GeneD$_x$ Panel | Invitae |
|---|---|---|---|---|---|
| NEXN | Unknown | Hypertrophic cardiomyopathy | X | X | X |
| PDLIM3 | Unknown | None | X | X | X |
| PKP2 | AD | Arrhythmogenic right ventricular dysplasia | X | X | X |
| PLEKHM2 | AR | Left ventricular noncompaction | | | X |
| PLN | AD | Hypertrophic cardiomyopathy | X | X | X |
| PRDM16 | AD | Left ventricular noncompaction | X | | X |
| PSEN1 | AD | Alzheimer disease; familial acne inversa; pick disease | | | |
| PSEN2 | Unknown | Alzheimer disease | | | |
| RAF1 | AD | LEOPARD syndrome; Noonan syndrome | | X | X |
| RBM20 | AD | None | X | X | X |
| SCN5A | AD | Atrial fibrillation; Brugada syndrome; long QT syndrome; sick sinus syndrome; ventricular fibrillation | X | X | X |
| SGCD | AD/AR | Limb-girdle muscular dystrophy | X | X | X |
| SYNE1 | AD | Emory-Dreifuss muscular dystrophy; spinocerebellar ataxia | | | |
| TAZ | XL | Barth syndrome | X | X | X |
| TCAP | AR | Hypertrophic cardiomyopathy; limb-girdle muscular dystrophy | X | X | X |
| TNNC1 | AD | Hypertrophic cardiomyopathy | X | X | X |
| TNNI3 | AD/AR | Hypertrophic/restrictive cardiomyopathy | X | X | X |
| TNNI3K | AD | Atrial tacharrhythmia; conduction system disease | | | |
| TNNT2 | AD | Hypertrophic/restrictive; left ventricular noncompaction | X | X | X |
| TPM1 | AD | Hypertrophic cardiomyopathy; left ventricular noncompaction | X | X | X |
| TMPO | Unknown | None | | X | X |
| TTN | AD | Hypertrophic cardiomyopathy; limb-girdle muscular dystrophy; myopathy; tibial muscular dystrophy | X | X | X |
| VCL | AD | Hypertrophic cardiomyopathy | X | X | X |

AD, autosomal dominant; AR, autosomal recessive; XL, X-linked.

**Table S3.** Inherited, non-segregating variants in sporadic DCM.

| Family | Gene Symbol | Inheritance | Transcript Variant | Protein Variant | CADD Score (%ile) | ExAC MAF (Eur) | Gene Ontology |
|---|---|---|---|---|---|---|---|
| **DC-45** | *CAV3* | Paternal* | c.233C>T NM_033337.2 | p.T78M | 23.7 (65) | 0.41% | Scaffolding protein |
| **DC-62** | *LAMA4* | Paternal | c.227C>T NM_001105206.2 | p.S76L | 18.95 (35) | -- | Extracellular matrix |
| | *LDB3* | Paternal* | c.493C>T NM_007078.2 | p.R165W | 10.7 (20) | 0.01% | Z-disk |
| **DC-68** | *FHL2* | Maternal | c.725G>A NM_001450.3 | p.R242Q | 33 (>95) | 0.00% | Protein-protein interaction |
| **DC-70** | *MYBPC3* | Maternal | c.2497G>A NM_000256.3 | p.A833T | 32 (95) | 0.27% | Sarcomeric cytoskeleton |
| **DC-79** | *SYNE1* | Paternal | c.11187G>T NM_182961.3 | p.K3729N | 21.6 (45) | 0.62% | Nuclear membrane |
| | *MYBPC3* | Paternal | c.977G>A NM_000256.3 | p.R326Q | 24 (65) | 0.85% | Sarcomeric cytoskeleton |
| **DC-80** | *TMEM43* | Paternal* | c.1061G>C NM_024334.2 | p.C354S | 22.7 (55) | 0.08% | Nuclear membrane |
| | *ACTC1* | Maternal* | c.382A>G NM_005159.4 | p.T128A | 23.3 (55) | -- | Sarcomere force generation |
| **DC-92** | *PKP2* | Paternal or *de novo* | c.1592T>G NM_004572.3 | p.I531S | 25.6 (80) | 0.77% | Desmosome |
| | *DSC2* | Paternal or *de novo* | c.1729A>G NM_024422.4 | p.I577V | <10 (<2) | 0.06% | Desmosome |
| **DC-95** | *SCN5A* | Paternal | c.488C>T NM_198056.2 | p.T163I | 20.4 (40) | -- | Voltage-gated Na channel |
| | *MYH6* | Paternal | c.3010G>T NM_002471.3 | p.A1004S | 22.9 (50) | 0.11% | Sarcomere force generation |

--, not reported; *variant is inherited by both affected and unaffected sibling(s); *ACTC1*, actin, alpha, cardiac muscle 1; *CAV3*, caveolin 3; *DSC2*, desmocollin 2; *FHL2*, four and a half LIM domains 2; *LAMA4*, laminin subunit alpha 4; *LDB3*, LIM domain binding 3; *MYBPC3*, myosin binding protein C, cardiac; *MYH6*, myosin heavy chain 6; *PKP2*, plakophilin 2; *SCN5A*, sodium voltage-gated channel alpha subunit 5; *SYNE1*, spectrin repeat containing nuclear envelope protein 1; *TMEM43*, transmembrane protein 43.