GENETIC MUTATIONS ASSOCIATED WITH CARDIOMYOPATHY

Dilated Cardiomyopathy (DCM)

Primary DCM causing genetic mutations are autosomal dominant inherited.

Secondary DCM causing genetic mutations are X-linked or autosomal recessive inherited.

Cytoskeletal and sarcolemmal genes

- Delta-sarcoglycan (SGCD)
- Desmin (DES)
- Metavinculin/Vinculin (VCL)

Z-disk genes

- Alpha-actinin-2 (ACTN2)
- Muscle LIM protein (MLP)
- Telethonin (T-Cap)
- Titin (TTN)
- ZASP (LDB3)

Sarcomere genes

- Alpha-tropomyosin (TPM1)
- Beta-myosin heavy chain (MYH7)
- Cardiac alpha-actin (ACTC1)
- Cardiac troponin-T (TNNT2)

Lamin A/C (LMNA) gene

X-linked inheritance

- Dystrophin gene (DMD) – causes Duchenne and Becker muscular dystrophies
- Tafazzin G4.5 (TAZ) – causes Barth syndrome

Autosomal recessive inheritance

- Mitochondrial DNA and metabolic enzymes – causes Acyl-CoA dehydrogenase deficiency disorders

Hypertrophic Cardiomyopathy (HCM)

Primary HCM causing genetic mutations are autosomal dominant inherited.

Secondary HCM causing genetic mutations are autosomal recessive inherited.

Sarcomere genes

- Alpha-tropomyosin (TPM1)
- Beta-myosin heavy chain (MYH7)
- Cardiac alpha actin (ACTC1)
- Cardiac troponin C (TNNC1)
- Cardiac troponin T (TNNT2)
- Essential myosin light chains (MYL3)
- Myosin binding protein-C (MYBPC3)
- Regulatory myosin light chains (MYL2)

Non-sarcomeric genes

- Acid alpha-glucosidase (GAA) – causes Pompe disease

Restrictive Cardiomyopathy (RCM)

Certain RCM causing genetic mutations are autosomal dominant or autosomal recessive inherited.

Autosomal dominant inherited

- Cardiac alpha actin (ACTC1)
- Cardiac troponin T (TNNT2)
- Desmin (DES)
- Lamin A/C (LMNA)

Autosomal recessive inherited

- Glycogen storage diseases

Arrhythmogenic Cardiomyopathy (AC)

ARVC causing genetic mutations are autosomal dominant or autosomal recessive inherited.

Autosomal dominant inheritance

- Cardiac ryanodine receptor 2 (RYR2)
- Desmocollin-2 (DSC2)
- Desmoglein-2 (DSG2)
- Plakophillin-2 (PKP2)
- Transforming growth factor-beta 3 (TGFB3)
- Transmembrane protein 43 (TMEM43)

Autosomal recessive inheritance

- Plakoglobin (JUP) – causes Naxos syndrome
- Desmoplakin (DSP) – causes Carvajal syndrome

Left Ventricular Non-Compaction Cardiomyopathy (LVNC)

LVNC causing genetic mutations are X-linked or autosomal dominant inherited.

X-linked inheritance

- Tafazzin G4.5 gene (TAZ) – causes Barth syndrome and mitochondrial disorders

Autosomal dominant inheritance

- Alpha-dystrobrevin (DTNA)
- Cardiac alpha-actin (ACTC1)
- Cardiac troponin T (TNNT2)
- ZASP (LDB3)