

Patient Name: John Doe	Patient ID: 0123456	Collection Date: 12-20-2024
Date of Birth: 02-20-1975	Helix ID: TST12345	Order Date: 12-20-2024
Sex Assigned at Birth: MALE	Provider Name: Client Client	Report Date: 01-03-2025
Specimen Type: WHOLE BLOOD	Provider Address: -	

Helix Comprehensive Cardiomyopathy and Arrhythmias Panel

Results UNCERTAIN

Classification	Gene	DNA Change	Protein Change	Zygosity	Inheritance
UNCERTAIN SIGNIFICANCE	ANK2	c.8261C>T	p.Ala2754Val	Heterozygous	AD

This test did not detect any clinically significant variants within the analyzed gene(s). Variant(s) of Uncertain Significance were detected in the ANK2 gene.

The clinical impact of the identified variant(s) is uncertain; there is insufficient evidence to determine if there is a disease association. Alteration to medical management is NOT recommended based solely on this result and should instead be guided by personal medical and family history.

The ANK2 gene is associated with the following condition(s):

- autosomal dominant complex neurodevelopmental disorder (MedGen UID: 1800189)

This gene also has limited evidence suggesting a possible association with the following condition(s): autosomal dominant ankyrin-B-related cardiac arrhythmia (MedGen UID: 370181).

Additional clinical information and/or testing biological family members is unlikely to assist in the reclassification of the detected variant(s) at this time.

The Variant Interpretation section below may provide additional details regarding the reported variant(s). Genetic test results should be interpreted in the context of an individual's personal medical and family history. It is important to note that this assay cannot detect all variants known to increase disease risk. Genetic counseling is recommended. Clinical correlation is advised.

Test Description

This panel evaluates 103 genes associated with cardiomyopathy and arrhythmia, and several syndromic conditions associated with cardiomyopathy and arrhythmia.

Genes Tested

ABCC9, ACAD9, ACADVL, ACTC1, ACTN2, AGL, ALMS1, ALPK3, ANK2, BAG3, BMP10, BRAF, CACNA1C, CACNA1D, CALM1, CALM2, CALM3, CASQ2, CAV3, CDH2, CPT2, CRYAB, CSRP3, DES, DMD, DNAJC19, DOLK, DSC2, DSG2, DSP, DTNA, ELAC2, EMD, FHL1, FKRP, FKTN, FLNC, GAA, GLA, HCN4, HRAS, JPH2, JUP, KCNE1, KCNE2, KCNH2, KCNJ2, KCNQ1, KRAS, LAMP2, LMNA, LZTR1, MAP2K1, MAP2K2, MRAS, MTO1, MYBPC3, MYH7, MYL2, MYL3, MYL4, MYLK3, MYPN, NEXN, NKX2-5, NRAS, PCCA, PCCB, PKP2, PLN, PPA2, PPCS, PRDM16, PRKAG2, PTPN11, RAF1, RBM20, RIT1, RYR2, SCN5A, SGCD, SHOC2, SLC22A5, SLC4A3, SOS1, SOS2, SYNE2, TAFAZZIN, TBX20, TCAP, TECRL, TMEM43, TMEM70, TNNC1, TNNI3, TNNI3K, TNNT2, TPM1, TRDN, TRIM63, TTN, TTR, VCL

Patient Name: John Doe	Patient ID: 0123456	Collection Date: 12-20-2024
Date of Birth: 02-20-1975	Helix ID: TST12345	Order Date: 12-20-2024
Sex Assigned at Birth: MALE	Provider Name: Client Client	Report Date: 01-03-2025
Specimen Type: WHOLE BLOOD	Provider Address: -	

Helix Comprehensive Cardiomyopathy and Arrhythmias Panel

Classification	Gene	DNA Change	Protein Change	Zygosity	Inheritance
UNCERTAIN SIGNIFICANCE	ANK2	c.8261C>T	p.Ala2754Val	Heterozygous	AD
Transcript: NM_001148.6		Genomic Change: NC_000004.12:g.113356879C>T			
<h3>Variation Interpretation</h3> <p>This variant (NM_001148.6:c.8261C>T p.Ala2754Val) results in the substitution of alanine with valine at codon 2754 in the ANK2 protein. It is a rare variant that is absent from the large gnomAD population database (PMID: 32461654). To our knowledge, this variant has not been reported in individuals affected with ANK2-related conditions. In silico prediction from REVEL (PMID: 27666373) suggests that this variant may be benign. This variant is present in ClinVar (Variation ID: 238592). In conclusion, since the available evidence is limited, the clinical significance of this variant is unclear at this time. Therefore, it is classified as a Variant of Uncertain Significance.</p>					

Patient Name: John Doe	Patient ID: 0123456	Collection Date: 12-20-2024
Date of Birth: 02-20-1975	Helix ID: TST12345	Order Date: 12-20-2024
Sex Assigned at Birth: MALE	Provider Name: Client Client	Report Date: 01-03-2025
Specimen Type: WHOLE BLOOD	Provider Address: -	

Helix Comprehensive Cardiomyopathy and Arrhythmias Panel

Methods & Limitations

Extracted DNA is enriched for targeted regions and then sequenced using the Helix Exome+ (R) assay on an Illumina DNA sequencing system. Data is then aligned to a modified version of GRCh38 and all genes are analyzed using the MANE transcript and MANE Plus Clinical transcript, when available. Small variant calling is completed using a customized version of Sentieon's DNaseq software, augmented by a proprietary small variant caller for difficult variants. Copy number variants (CNVs) are then called using a proprietary bioinformatics pipeline based on depth analysis with a comparison to similarly sequenced samples. Interpretation is based upon guidelines published by the American College of Medical Genetics and Genomics (ACMG) and the Association for Molecular Pathology (AMP) or their modification by ClinGen Variant Curation Expert Panels when available. Interpretation is limited to the transcripts indicated on the report, +/- 10 bp into intronic regions, except as noted below. Helix variant classifications include pathogenic, likely pathogenic, variant of uncertain significance (VUS), likely benign, and benign. Variants classified as pathogenic, likely pathogenic, or VUS are included in the report. All reported variants (except for VUSs with limited evidence of pathogenicity) are confirmed through secondary manual inspection of DNA sequence data or orthogonal testing. Benign and likely benign variants are not reported but are available upon request. Risk estimations and management guidelines included in this report are based on analysis of primary literature and recommendations of applicable professional societies, and should be regarded as approximations.

Based on validation studies, this assay delivers > 99% sensitivity and specificity for single nucleotide variants and insertions and deletions (indels) up to 20 bp. Larger indels and complex variants are also reported but sensitivity may be reduced. Based on validation studies, this assay delivers > 99% sensitivity to multi-exon CNVs and > 90% sensitivity to single-exon CNVs. This test may not detect variants in challenging regions (such as short tandem repeats, homopolymer runs, and segment duplications), sub-exonic CNVs, chromosomal aneuploidy, or variants in the presence of mosaicism. Phasing will be attempted and reported, when possible. Structural rearrangements such as inversions, translocations, and gene conversions are not tested in this assay unless explicitly indicated. Additionally, deep intronic, promoter, and enhancer regions may not be covered. It is important to note that this assay cannot detect all variants known to increase disease risk, and that a negative result does not guarantee that the tested individual does not carry a rare, undetectable variant in genes analyzed. Any potential incidental findings outside of these genes and conditions will not be identified, nor reported. The results of a genetic test may be influenced by various factors, including bone marrow transplantation, blood transfusions, or in rare cases, hematolymphoid neoplasms.

Gene Specific Notes: AGL: Evaluation of chr1: 99916398 (c.4260-12A>G) will be performed. ALPK3: Sensitivity in exon 1 may be reduced. BRAF: Sensitivity in exon 1 may be reduced. CDH2: Sensitivity in exon 1 may be reduced. DMD: Evaluation of chrX:33174335 (c.31+36947G>A), chrX:31261663 (c.9225-647A>G), and chrX:31261301 (c.9225-285A>G) will be performed. FKTN: Evaluation of chr9:105606576 (c.648-1243G>T) will be performed. GAA: Evaluation of chr17:80104542 (c.-32-13T>G), chr17:80104552 (c.-32-3C>A), chr17:80104554 (c.-32-1G>C), and chr17:80108467 (c.1076-22T>G) will be performed. GLA: Evaluation of chrX: 101399747 (c.640-801G>A) will be performed. KCNH2: Evaluation of Chr7:150958048-150958065 (c.910_916+11del) will be performed. KCNQ1: Evaluation of Chr11:2461715 (c.386+16231G>A), Chr11:2585210-2585211 (c.1033-1_1117dup) will be performed and sensitivity in KCNQ1 exon 1 may be reduced. MAP2K2: Sensitivity in exon 1 may be reduced. MYBPC3: Evaluation of chr11:47332275-47332299 (c.3628-41_2628-17del25), chr11:47347065 (c.906-36G>A), chr11:47346372 (c.927-2A>G), chr11:47343281 (c.1224-19G>A), chr11:47343314 (c.1224-52G>A), chr11:47343158 (c.1227-13G>A), and chr11:47340403 (c.1927+600C>T) will be performed. PRDM16: Analysis for exon 1 will not be performed. PRKAG2: Sensitivity in exon 5 may be reduced. SLC22A5: Evaluation of chr5:132369824 (c.-149G>A), chr5:132378362 (c.394-16T>A), and chr5:132386973 (c.825-52G>A) will be performed. SOS2: Sensitivity in exon 1 may be reduced. TRDN: Evaluation of Chr6:123636725 (c.22+29A>G) will be performed. TTN: Analysis for exons 172 to 197 will not be performed.



THIS IS A DIAGNOSTIC TEST

Patient Name: John Doe	Patient ID: 0123456	Collection Date: 12-20-2024
Date of Birth: 02-20-1975	Helix ID: TST12345	Order Date: 12-20-2024
Sex Assigned at Birth: MALE	Provider Name: Client Client	Report Date: 01-03-2025
Specimen Type: WHOLE BLOOD	Provider Address: -	

Helix Comprehensive Cardiomyopathy and Arrhythmias Panel

Disclaimer

This test was developed and validated by Helix, Inc. This test has not been cleared or approved by the United States Food and Drug Administration (FDA). The Helix laboratory is accredited by the College of American Pathologists (CAP) and certified under the Clinical Laboratory Improvement Amendments (CLIA #: 05D2117342) to perform high-complexity clinical tests. This test is used for clinical purposes. It should not be regarded as investigational or for research.

Reports Signed By

Philip D Cotter, PhD, FACMG, FFSC (RCPA)

Helix's Sequence Once, Query Often[®] Model

When your provider first orders a genetic test through Helix, Helix leverages its proprietary Sequence Once, Query Often[®] model to perform whole exome sequencing and interpret the specific genes related to the test being ordered. Helix will then continue to store your genetic information for future clinical use. This means that, with your permission, your health care providers can order future medically necessary genetic tests from Helix without the need for you to submit another sample in most cases. Instead, future tests will be performed through digital analysis of your genetic information that is stored by Helix.

When you receive a genetic test performed by Helix, you are in control of how and when your genetic information is used. To manage your genetic information and understand your rights, please visit <https://www.helix.com/privacy-and-policy-highlights>.