## Endocrine Disorders: Sequencing Panel

**Test Code:** MM290  
**Turnaround time:** 6 weeks  
**CPT Codes:** 81405 x1, 81406 x1, 81407 x1

### Condition Description

The Endocrine Disorders Panel primarily tests for two broad categories of endocrine disorders: (1) disorders of sexual development (DSD) and hormone production, and (2) transient or permanent neonatal diabetes mellitus (NDM) and maturity onset diabetes of the young (MODY). DSD may manifest in infancy with ambiguous genitalia or at puberty when atypical sexual development occurs. DSD include such things as hypogonadotropic hypogonadism (with or without anosmia), premature ovarian failure or ovarian dysgenesis, and congenital adrenal hyperplasia. DSD are important to diagnose early for proper treatment and management of these conditions. NDM and MODY are genetically heterogeneous disorders. A molecular genetic diagnosis is critical, since some monogenic diabetes can be treated with sulfonylureas, instead of requiring life-long insulin therapy.

**References:**
- Hughes et al., 2013 *Endocrine* abstracts 33: P48.

### Genes

ABCC8, AGPAT2, AKT2, BLK, BMP15, BSCL2, CHD7, CIDEC, CISD2, CYP17A1, CYP19A1, EIF2AK3, FGF8, FGFR1, FGILA, FOXP3, FSHR, GATA6, GCK, GDF9, GLIS3, GNRH1, GNRHR, HADH, HNF1A, HNF1B, HNF4A, IER3IP1, INS, INSR, KCNJ11, KISS1, KISS1R, KLF11, LHCGR, LMNA, NEUROD1, NOBOX, NR0B1, NR5A1, NSMF, PAX4, PDX1, POR, PPARG, PROK2, PROKR2, PSMC3IP, PTF1A, PTRF, RFX6, SLC2A2, TAC3, TACR3, TBC1D4, WFS1, ZMPSTE24

### Indications

This test is indicated for:
- Confirmation of a clinical diagnosis of disorders of sexual development.
- Confirmation of a clinical diagnosis of disorders of hormonal imbalance.
- Confirmation of a clinical diagnosis of neonatal diabetes mellitus.
- Confirmation of a clinical diagnosis of mature onset diabetes of the young.

### Methodology

**Next Generation Sequencing:** In-solution hybridization of all coding exons is performed on the patient's genomic DNA. Although some deep intronic regions may also be analyzed, this assay is not meant to interrogate most promoter regions, deep intronic regions, or other regulatory elements, and does not detect single or multi-exon deletions or duplications. Direct sequencing of the captured regions is performed using next generation sequencing. The patient's gene sequences are then compared to a standard reference sequence. Potentially causative variants and areas of low coverage are Sanger-sequenced. Sequence variations are classified as pathogenic, likely pathogenic, benign, likely benign, or variants of unknown significance. Variants of unknown significance may require further studies of the patient and/or family members.

### Detection

**Next Generation Sequencing:** Clinical Sensitivity: Unknown. Mutations in the promoter region, some mutations in the introns and other regulatory element mutations cannot be detected by this analysis. Large deletions/duplications will not be detected by this analysis. Results of molecular analysis should be interpreted in the context of the patient's clinical/biochemical phenotype.

**Analytical Sensitivity:** ~99%.

### Specimen Requirements

Submit only 1 of the following specimen types

#### Type: Whole Blood

Specimen Requirements:
- In EDTA (purple top) tube:
  - Infants (2 years): 3-5 ml
  - Older Children & Adults: 5-10 ml

Specimen Collection and Shipping: Ship sample at room temperature with overnight delivery.

#### Type: Isolated DNA

Specimen Requirements:
In microtainer: 60 ug

Isolation using the Qiagen™ Puregene kit for DNA extraction is recommended.

Specimen Collection and Shipping: Refrigerate until time of shipment in 100 ng/ul of TE buffer. Ship sample at room temperature with overnight delivery.

**Related Tests**

- Maturity Onset Diabetes of the Young Panel
- Endocrine Disorders: Deletion/Duplication Panel