



# Methylation Panel

## *Key Clinical Messages*

### What is Methylation?

Methylation is a fundamental biochemical process that occurs in the body a billion times per second. It aids in processing nutrients and molecules to support various body systems and plays a crucial role in gene regulation.

**Methylation is imperative to many biochemical processes in the body including:**

- Hormone, heavy metal, and chemical detoxification
- Nitric oxide production and vascular health
- Neurotransmitter metabolism
- Histamine metabolism
- Glutathione production
- DNA and RNA synthesis
- Cell membrane repair
- Epigenetic modification
- Immunomodulation
- ATP synthesis
- Myelination
- And more

### Why Order The Methylation Panel?

- Methylation pathways significantly overlap with virtually all organ systems and metabolic functions in the human body and can impact health, energy, detoxification, emotional and psychological function, and cognition.
- Essential nutrients like folate and vitamin B12 are vital for methylation. Deficiencies can impair methylation, leading to illness and reduced quality of life. Genetic abnormalities in methylation-related genes can also disrupt these cycles.

**Regulatory Statement:**

This test has been laboratory developed and their performance characteristics determined by Vibrant America LLC, a CLIA-certified laboratory performing the test CLIA#:05D2078809. The test has not been cleared or approved by the U.S. Food and Drug Administration (FDA). Although FDA does not currently clear or approve laboratory-developed tests in the U.S., certification of the laboratory is required under CLIA to ensure the quality and validity of the tests.



## What Markers Are Included?

### Methylation Genetics:

- MTHFR (677)
- MTHFR (1298)
- COMT rs4680 (Val158Met)
- COMT rs4633
- MTRR rs1801394 (A66G)
- MTRR rs162036
- MAT1A rs3851059
- SHMT1 rs1979277
- GNMT rs10948059\*
- BHMT rs3733890\*
- MTR rs1805087\*
- NOS3 rs1799983

### Functional Methylation Markers:

- Homocysteine (marker of impaired methylation status)
- Folate (methyl donor)
- Vitamin B12 (methyl donor)

*\*Upregulating SNPs (all other SNPs downregulate enzyme function)*

## Which Patients Benefit From This Test?

### Conditions, Signs, and Risks associated with poor methylation:

- Hyperhomocysteinemia (MTR, MTRR, BHMT)
- Cardiovascular disease (MAT1A, MTHFR)
- Psychological & mood disorders (COMT, MTHFR, hyperhomocysteinemia)
- Migraine headaches (COMT)
- Fibromyalgia (COMT)
- Parkinson's Disease (hyperhomocysteinemia)
- Alzheimer's Disease (hyperhomocysteinemia)
- Impaired detoxification (GNMT, COMT)
- Increased breast cancer risk (COMT\*)
- Inflammatory bowel disease (hyperhomocysteinemia)
- Colorectal cancer (MTRR\*, hyperhomocysteinemia)
- Eating disorders (COMT)

*\*Research inconsistent*

## Test Preparation

- **Fasting:** Not required
- **Collection:** Two (2) SST tubes, three (3) EDTA tubes
- **Supplements:** There are no dietary supplement restrictions required before taking the Methylation Panel test. However, some ordering providers may recommend discontinuing vitamin B12 and/or folate supplements 7-14 days before testing to assess "baseline" (normal) levels. Some ordering providers may prefer to test B12 and folate levels while taking these dietary supplements to assess how well they are being absorbed.

## Why Vibrant?

### Lab Methodology

Vibrant is a **CLIA-certified and CAP-accredited lab** that utilizes reliable, high-quality methodologies to measure genes and biomarkers for the Methylation Panel.

### Enzymatic Assay for the measurement of homocysteine with advantages that include:

- High specificity
- Quick runtime

### Electrochemiluminescence immunoassay (ECLIA) for serum markers folate and B12 with advantages that include:

- Quicker than ELISA
- Broad dynamic range
- High sensitivity

### Real-time PCR for SNPs with advantages that include:

- Limited likelihood of contamination compared to standard PCR
- No need for post-PCR analysis



## What Tests Pair Well With The Methylation Panel?

- **Total Tox Burden (Environmental Toxin, Mycotoxin and Heavy Metals tests)** - Methylation status can impair or influence detoxification pathways which impacts toxin burden in the body.
- **Neurotransmitters** – Methylation status can impact mood disorders via effects on neurotransmitter production and metabolism.
- **Gut Zoomer** - Tests for microbiome and estrobolome epigenetic influences on methylation status such as bacterial folate production, consumption, and more
- **NutriPro** – Provides testing on methylation nutrient cofactors with serum and intracellular nutrient levels plus specific, nutrition related genetic SNPs.
- **Urinary Hormones** – Evaluates epigenetic influences on methylation, such as estrogen metabolism and oxidative stress.
- **Neural Zoomer Plus** – The Methylation Panel assesses for hyperhomocysteinemia which has been associated with Parkinson’s disease and Alzheimer’s disease, both of which may be further assessed for using neural autoimmunity markers available on Neural Zoomer Plus.




## Reference Ranges

Variant alleles are indicated with a + symbol and wild type alleles are indicated with a – symbol. Elevated risk associated variants are indicated with **red**, partially elevated risk associated variants are indicated with **yellow**, and normal risk associated variants are indicated with **green**.

Note: the variant alleles do not always correlate with risk.

Methylation							
		⊕⊕ Homozygous Mutant		⊕⊖ Heterozygous		⊖⊖ Homozygous Wild	
Test Name	Gene Name	Risk Association	Your Mutation	Your Risk	Reference		
rs1801133	MTHFR	Active folate deficiency	⊕⊖ C/T	Partially elevated	C/C		
rs1801131	MTHFR	Active folate deficiency	⊕⊕ A/A	Normal	A/C, A/A		
rs1801394	MTRR	Failure to convert homocysteine to methionine	⊕⊖ A/G	Partially elevated	A/A		
rs3851059	MAT1A	Homocysteine builds up in the bloodstream	⊕⊕ G/G	Normal	G/G		
rs1979277	SHMT1	Active folate deficiency	⊕⊖ C/T	Partially elevated	C/C		
rs10948059	GNMT	Methionine and SAME build up in the blood	⊕⊕ T/T	Elevated	C/C		
rs3733890	BHMT	Homocysteine builds up in the bloodstream	⊖⊖ A/A	Elevated	G/G		

Serum Markers are reported as both a number and plotted graphically, so you can visually see how high or low your patient’s results are.

Serum Markers					
Test Name	Current	Previous	Result	Reference	
Homocysteine (μmol/L)	10			≤9.0	
Vitamin B12 Serum (pg/mL)	1317			232.0-1245.0	
Folate Serum (ng/mL)	>20			≥4.6	