

FOLATE METABOLISM PROFILE

Folate is a water soluble B vitamin (B9), which humans cannot synthesise and is thus a dietary requirement. The primary function of folate is the transfer of methyl and formyl groups. It is essential for cell growth and reproduction, the formation of certain amino acids (methionine, serine, glycine and histidine), the breakdown of proteins (e.g. homocysteine), the formation of DNA and RNA, red blood cell maturation and serotonin, noradrenaline (norepinephrine) and dopamine formation.

Active and Inactive Forms of Folate

Dihydrofolate (DHF) is the dietary form of folate, whilst folic acid is the synthetic form of folate used in supplements and to fortify the food supply. These forms of folate are not biologically active; they must undergo enzymatic transformation to L-methylfolate in order to be used by cells. L-methylfolate, unlike the other folates, is able to cross the blood-brain barrier for use in the CNS.

The conversion of dihydrofolate (DHF) and folic acid to L-methylfolate occurs through a three or four step process:

- Folic acid is converted to DHF by the dihydrofolate reductase enzyme (DHFR)
- DHF is then converted to tetrahydrofolate (THF)
- THF is converted to 5,10-methyleneTHF
- 5,10-methyleneTHF is converted to L-methylfolate by the methyltetrahydrofolate reductase enzyme (MTHFR).

L-MethylFolate Deficiencies

For many people, their DHF from the diet leads to adequate L-methylfolate levels, however, malabsorption, digestive and liver disease, as well as certain genetic enzyme polymorphisms, can result in an impaired ability to activate folic acid. This L-methylfolate deficiency results in symptoms and conditions including mental health disorders, cardiovascular disease, increased adiposity, reduced lean body mass, birth defects and an increased risk for certain cancers.

Folate metabolism is required for optimal methylation. Methylation is a major pathway to focus on in understanding autoimmune and neurological diseases such as multiple sclerosis, seizure disorders, dementia, chronic fatigue syndrome, lupus, depression, anxiety and autism spectrum disorders. Methylation is responsible for making, maintaining and repairing DNA.

The Methylation Cycle is a biochemical pathway that manages or contributes to a wide range of biochemical functions: detoxification, supporting DNA (turning genes on and off), producing energy, reducing inflammation, synthesising neurotransmitters, homocysteine metabolism, protein methylation, phase 2 liver detoxification and supporting immune function.

Inadequate methylation capacity can lead to birth defects, depression, cognitive decline and cancer. Impaired methylation has even been associated with autism. Support of methylation markers has been associated with rapid return of speech, improvement of behaviour in ADD and ADHD spectrums.

CONDITIONS ASSOCIATED WITH IMPAIRED FOLATE AND METHYLATION DEFECTS	
Allergies	Diabetes
Autism	High folate supplementation
Cancer	Infertility, Pre-conception care
Chronic Fatigue Syndrome	Mental health disorders
Cognitive decline	Oestrogen dominance
Cardiovascular disease	Schizophrenia

FOLATE METABOLISM PROFILE [Test code: 5102]

- ❖ 5-methyl tetrahydrofolate (5MTHF), Folinic acid, Tetrahydrofolate (THF); active Vitamin B12 (holotranscobalamin), serum Folate, Homocysteine

Other methylation tests available:

- **Methylation Profile [5101]:** S-Adenosyl Methionine (SAmE), S-Adenosyl Homocysteine (SAH), SAmE:SAH ratio; 5-methyl tetrahydrofolate (5MTHF), Folinic acid, Tetrahydrofolate (THF)
- **Methionine Metabolism Profile [5103]:** S-Adenosyl Methionine (SAmE), S-Adenosyl Homocysteine (SAH), SAmE:SAH; active Vitamin B12, serum Folate, Homocysteine; Methionine
- **SAmE & SAH [5105]:** S-Adenosyl Methionine (SAmE), S-Adenosyl Homocysteine (SAH), ratio
- **Vitamin B12 & Folate [6013]:** Active Vitamin B12, serum Folate
- **Glutathione, Oxidised [5107]:** Glutathione, oxidised
- **Glutathione, Reduced [5012]:** Glutathione, reduced
- **Histamine (whole blood) [4006]:** Histamine
- **Homocysteine [4007]:** Homocysteine
- **Advanced Methylation Genetics (buccal swab) [8009]:** SNPs for MTHFR, MTR, MTRR, AHCY, COMT
- **MTHFR [5018]:** Methylenetetrahydrofolate reductase (MTHFR) C677T & A1298C SNPs

How to order a test kit:

To order a test kit simply request the test name and/or test code on a NutriPATH request form test code and have the patient phone NutriPATH Customer Service on 1300 688 522.



Phone 1300 688 522 for further details
www.nutripath.com.au