METHYLATION

Vitamin B3
Maintains proper methylation of genes that suppress tumor formation and growth.[3,4,5,6]

Vitamin B6
Cofactor for the enzyme (serine hydroxyl methyl transferase) that transfers methyl units.[7,8]

Vitamin B12
B12 is a key enzyme needed in the synthesis of S-adenosylmethionine (SAMe), the body's most important methyl donor. Methionine synthase, an enzyme that catalyzes the methylation cycle is B12 dependent.[9,10,11]

Folate
Methyl donor for many reactions in the body, including neurotransmitter synthesis and conversion of homocysteine to methionine; Precursor to SAMe; Required for proper DNA synthesis.[12,13,14]

Vitamin B2
Helps recycle folate into a usable methyl-donor form; Precursor to FAD (flavin adenine dinucleotide) which assists methylation reactions.[1,2,3]

Choline
A major source of methyl groups (methyl donor); Deficiency linked to DNA damage.[15,16,17]

Serine
Important methyl donor, especially in the case of folate deficiency.[18,19,20]

Zinc
Deficiency can lower the ability to use methyl groups from methyl donors such as SAMe, thus causing global hypo-methylation of DNA.[32,33,34]

Glutathione
Deficiency impairs methylation reactions and hinders synthesis of the methyl donor SAMe.[21,22]

Vitamin C
Deficiency alters methylation patterns in cancer cells; Also a cofactor for methylating enzymes.[23,24]

Selenium
Inhibits a methylating enzyme (DNA methyltransferase) in cancer genes, effectively turning them off; Selenoproteins protect DNA and metabolize methionine.[30,31]

Magnesium
Its role in the methylation of genes that affect glucose metabolism may explain the link between magnesium deficiency and diabetes.[28,29]

Copper
Several key enzymes needed for methylation reactions are copper dependent.[25,26,27]

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