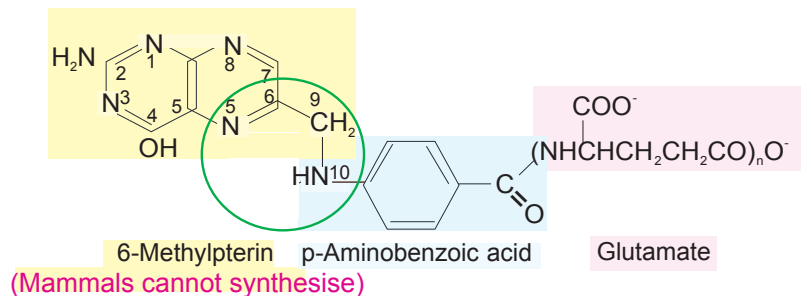


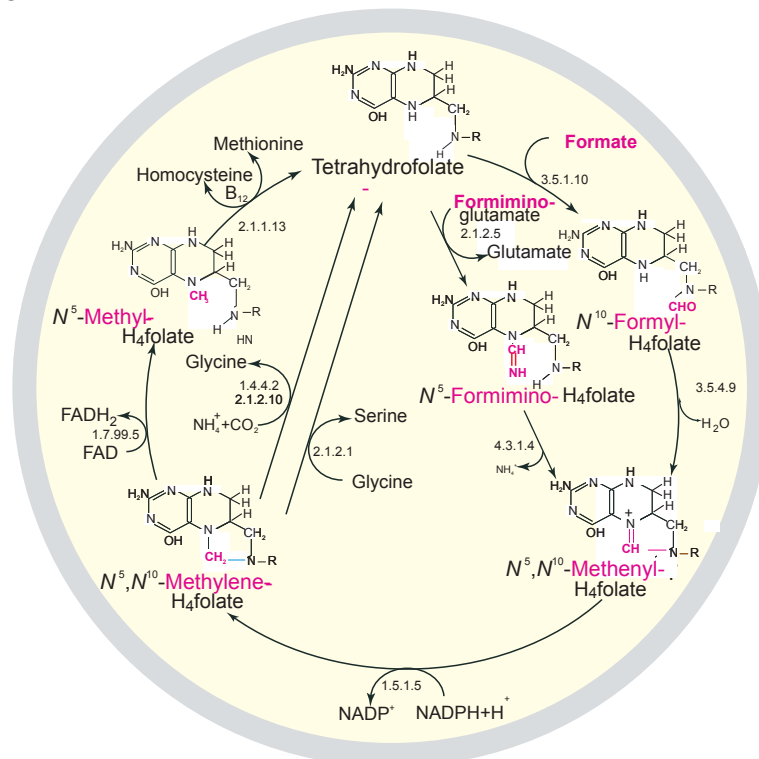
FOLIC ACID C1 POOL



FOLIC ACID

Folic acid is not itself biochemically active and must first be reduced at the 5-6 and 7-8 double bonds by dihydrofolate reductase (1.5.1.3) to form *TETRAHYDROFOLIC ACID* (H_4 folate). This is the origin of a variety of derivatives which are involved in the transfer of one-carbon ($C1$) units, other than CO_2 , and which may be described as the *C1-FOLIC ACID POOL*. They exist at different levels of oxidation equivalent to *methyl* ($-CH_3$), *methylene* ($-CH_2-$), *formyl* ($-CH=O$), *formimino* ($-CH=NH$), and *methenyl* ($-CH=$) and their reactions and interrelationships are illustrated below.

The 4-atom system of N-5, C-6, C-9 and N-10, which is circled, is a chelating agent and hence has a high affinity for formaldehyde.



ENZYMES

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|----------|---|----------|--|
| 1.4.4.2 | Glycine dehydrogenase (decarboxylating) | 2.1.2.3 | Phosphoribosylamidoimidazole-carboxamide formyltransferase |
| 1.5.1.3 | Dihydrofolate reductase | 2.1.2.5 | Glutamate formiminotransferase |
| 1.5.1.5 | Methylene-THF dehydrogenase ($NADP^+$) | 2.1.2.10 | Aminomethyltransferase |
| 1.7.99.5 | 5,10-Methylene-THF reductase ($FADH_2$) | 3.5.1.10 | Formyl-THF deformylase |
| 2.1.1.13 | 5-Methyl-THF—homocysteine S-methyltransferase | 3.5.4.9 | Methenyl-THF cyclohydrolase |
| 2.1.1.45 | Thymidylate synthase | 4.3.1.4 | Formimino-THF cyclodeaminase |
| 2.1.2.1 | Glycine hydroxymethyltransferase | 6.3.3.2 | 5-Formyl-THF cyclo-ligase |
| 2.1.2.2 | Phosphoribosylglycinamide formyltransferase | 6.3.4.3 | Formate-tetrahydrofolate ligase |