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Viewer discretion advised: Material may contain medical images that may be disturbing to some viewers.
Folic Acid is Synthesized By Bacteria

Dietary folate: folic acid (meats, green veggies) *requires* the intestinal enzyme ‘Conjugase’ for absorption.
Inhibitors of DHFR are important therapeutics:
Methotrexate - chemotherapy
Trimethoprim - inhibits bacterial DHFR
Pyrimethamine - inhibits malarial DHFR
Tetrahydrofolate + \text{serine} \rightarrow \text{glycine} + \text{N}^\alpha,\text{N}^\beta \text{methylene tetrahydrofolate}

Tetrahydrofolate + \text{glycine} \rightarrow \text{N}^\alpha,\text{N}^\beta \text{methylene tetrahydrofolate}
Methionine Cycle
And Biological Methyl Groups
Homocysteine → N^6-methyl THF → THF → Vitamin B_12 → Methionine
Carbon donor (e.g. serine or glycine)

Tetrahydrofolate

N^6, N^4 methylene tetrahydrofolate

methionine

homocysteine

NADH + H^+

NAD^+

N^6 methyl tetrahydrofolate
Other methyl acceptors:
DNA ("CpG Islands")
RNA
**Folate Deficiencies:** Symptom: megaloblastic anemia

**Dietary deficiency:**
Common especially in developing countries, lower socioeconomic classes
Folate deficiency secondary to bowel irritation:

- Conjugase is essential for adequate absorption of dietary folates

- Conjugase production may be compromised by bowel irritation:

  ‘Tropical Sprue’ - bowel irritation probably arising from bacterial origin, causes intestinal inflammation and malabsorption.

  ‘Celiac Sprue’ - similar outcome, but the original irritation is due to an allergic response, for example to gliaden (a component in gluten)
Folate Deficiency Secondary to B12 deficiency: the ‘methyl trap’ hypothesis

B12 is also critical in other reactions, ones for which the deficiency has serious neurological consequences.